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SUBLUXATION OF THE HUMERUS,
FORWARDS AND INWARDS.

BY

CHARLES H. HALLETT,

DEMONSTRATOR OF ANATOMY IN THE UNIVERSITY OF EDINBURGH.

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SUBLUXATION OF THE HUMERUS.

It is my intention to detail, in this notice, the different circumstances connected with partial dislocation of the humerus forwards and inwards, two examples of which have been examined in the dissecting-room of the University. I am led to do so because the morbid appearances and general characters of this subluxation are unnoticed in the works especially devoted to the consideration of such injuries, probably on account of its not having yet attracted the attention of the surgeon, or of the surgical pathologist. A well-marked instance of it was met with, about three months since, in the right upper extremity of a man, who had been evidently possessed of great muscular strength during his life-time. On examining it, I found the lesions in the parts about the shoulder-joint to be curious and important, and to differ greatly from any I had previously read of. It was immediately remembered that a precisely similar state of matters had been previously observed in the dissecting-room, and that a preparation of the parts concerned in the lesion had been placed in the Anatomical Museum. This preparation was examined, and found to present the same appearances as that more recently made. A cast of the bust of the subject had been made before the dissection of the extremity was commenced, and thus I was enabled to observe more particularly the nature and extent of the deformity caused by this form of subluxation, to compare it with that resulting from other forms of luxation of the shoulder-joint, and to discover that the lesion was attended with signs so characteristic and defined as to render its diagnosis at once both easy and certain.

On these accounts, I shall enter into the consideration of all the circumstances attendant on the displacement, and detail the observations I have made concerning it; beginning, for reasons which will be evident as I proceed, with the morbid appearances.

The articulating surface of the head of the humerus was displaced entirely from the glenoid cavity of the scapula, was thrown forwards by extreme rotation outwards of the arm, and was driven inwards so as to overhang and project into the subscapular fossa, and to cause the protrusion forwards of the anterior wall of the axilla. The head of the humerus was prevented from gliding in the glenoid cavity during the execution of any of the movements of the limb, in consequence of striking changes in its form, which I shall attempt to describe. A large segment of bone had been removed from the external and posterior part of the head of the humerus, and from that portion of the anatomical neck which intervenes between the head and the greater tuberosity. More than half an inch had been ground down or absorbed to the level

of the shaft; and this had been so regularly and evenly performed, that it appeared rather to have been effected by mechanical means, as by a saw applied at first longitudinally, and then transversely through the whole depth of the head of the bone, so as to remove a prismatic portion of it, than by the increased action of the absorbents induced by constant attrition of the anterior lip of the glenoid cavity against the anatomical neck and head of the humerus. The whole of the depressed surface was covered with cartilage, and presented here and there a number of grooves of a brownish colour, where the cartilage was apparently deficient. These grooves indicated so many places in which the absorbing action was exerting its influence in removing the bone immediately before the individual expired.

The loss of this portion of bone had caused a material alteration in the configuration of the head. It no longer possessed its rounded hemispherical form, but had become irregularly ovoidal. The head of the bone appeared at first sight to have been considerably elongated, and this elongation seemed to have caused the alteration in its shape; but, on closer examination, the appearances were found to be deceptive. A large depression, therefore, existed on the inner and posterior part of the humerus: this depression presenting two surfaces, one longitudinal, which impinged against the anterior smooth surface of the neck of the scapula; the other transverse, which rested on the anterior half of the glenoid cavity, the corresponding lip of which was received into the angle formed by the meeting of these two surfaces. The glenoid cavity had not escaped from the effects of attrition, for that portion of the anterior lip which projects somewhat into the axilla, and is the strongest part of the cavity, had been absorbed, and thus reduced to the level of the surface of the neck. I might briefly state that the glenoid cavity in a perfect scapula is somewhat pyriform, that its inferior two-thirds represent a segment of a circle, whilst the superior third is a segment of an ellipse. Now, in both the cases I have examined, the projecting border of the circular portion had been removed and brought on a level with the ellipsoid portion, so that the glenoid cavity and the neck of the scapula had an elliptical form, which appeared like the change in the form of the head of the humerus, to have arisen from an increase of their longitudinal diameter; but I found from measurements, that this diameter was not increased—that it bore its usual relation to the size of the scapula. Besides these, some other changes require to be mentioned. The greater tuberosity of the humerus was situated in the posterior half of the glenoid cavity. It had its form altered in such a manner as to permit it to perform the movements which the joint, in its existing state, would admit of. The three surfaces into which the supraspinatus, infraspinatus, and teres minor muscles are inserted, were all merged into one smooth surface covered by the tendons of these muscles. The lower part of

this surface, which projected somewhat from the upper, chiefly occupied the glenoid cavity.

All the muscles inserted into the superior extremity of the humerus were involved in the displacement, and were all more or less elongated or shortened. The supraspinatus, infraspinatus, and teres minor muscles were all shortened to an appreciable extent. The pectoralis major and the subscapularis were elongated and on the stretch. The former set of muscles had their tendons of insertion flattened out and confounded with one another. The tendon of the subscapularis was probably thicker than usual at its lower part. The long tendon of the biceps, instead of passing over the centre of the head of the humerus, coursed over the superior border of the greater tuberosity and entered the bicipital groove, which, with the tendon of the biceps, was nearly in a line parallel with the posterior border of the glenoid cavity. The capsular ligament of the joint, and the tendon of the pectoralis major, assisted by a slight increase in the depth in the bicipital groove, the consequence of the absorption of a part of the greater tuberosity, prevented displacement of the long tendon of the biceps, a circumstance very likely to have happened, considering the relation of the parts, had not nature made some efficient provision against it.

There was no effusion of blood in or around the shoulder joint; no abnormal development of ligamentous tissue, nor any other change but such as I have mentioned, external to the joint. The lower portion of the capsular ligament of the joint, which had not the slightest appearance of having been ruptured, was united to the apparently thickened tendon of the subscapularis muscle, and with it, supported the head of the humerus as in a sling, and bound the greater tuberosity firmly down to the glenoid cavity.

Such are the morbid appearances and alterations seen in and about the two joints I have carefully examined. The older specimen differed from the more recent one, in one trivial and unimportant circumstance, namely, that a very small portion of the greater tuberosity of the humerus had been detached from it, and was found embedded in the capsular ligament. It was also taken from the right superior extremity of a male subject.

The articulating surfaces of the shoulder joint having undergone such extensive changes, we must expect the motions, usually performed by it, modified in a corresponding degree. Rotation, circumduction, and abduction were all in abeyance; adduction was imperfectly performed; and flexion and extension were the only movements that could be executed by the limb in any thing approaching the normal way. The position and changes in the muscles, and the manner in which the glenoid cavity and the head of the humerus were locked together, united to cause this paucity of motion. Thus, the arm could not be rotated inwards, because the longitudinal surface of the depression on the head of the

humerus abutted immediately against the neck of the scapula, and controlled all motion in that direction; the attempt to rotate outwards was equally ineffectual, for the subscapularis and pectoralis major muscles were already too much stretched to permit the external rotatory muscles to act efficiently; circumduction, depending on the power of moving the limb freely in every direction, could not be performed for the same reasons; every attempt at abduction was successfully resisted by the subscapularis, pectoralis major, and by the longitudinal surface of the depression on the head of the humerus. The other movements, not being restricted or controlled in any way, took place for the most part in the usual manner. It is to the power of flexing and extending the limb, whilst the other movements were imperfect, that we must refer the production of the depression on the head of the humerus.

The deformity occasioned by this form of subluxation greatly resembles that induced by complete dislocation forwards of the humerus. The acromion process was prominent and angular; and the deltoid muscle was flattened, whilst the anterior wall of the axilla was rendered prominent by the head of the humerus pushing it forwards—characters also peculiar to the dislocation forwards. Indeed on comparing casts of these two dislocations, it was found that the external characters about the shoulder were so similar and corresponded so closely that it would be impossible to distinguish them at first sight. The surgeon, however, would have no difficulty in recognising this subluxation, since, on placing his fingers in the axilla, he would discover the head of the humerus in the immediate vicinity of the glenoid cavity, the borders of which he would be unable to feel; moreover he would find the limb everted to a great extent; the hand and arm being turned from the body, and looking outwards, whilst the elbow was placed against the hip; and would be unable to rotate it inwards, provided the displacement had been of long standing. These characters, which were repeatedly noticed by myself and by Mr George Tate, the gentleman who was dissecting the limb, were absent, in every other form of dislocation, complete or incomplete, of the shoulder joint, and will hence serve as a ready and certain means of diagnosis. It is necessary for me to mention, that the deformity also resembles that occasioned by partial dislocation forwards of the humerus, but the circumstances of the limb being everted, and of flexion being perfectly performed, in the subluxation forwards and inwards, will point out the means of distinguishing them. I may also state, that these two forms of subluxation of the humerus differ from each other most materially in the changes which occur in and around the joint after the displacement has occurred; what these differences are need not be pointed out; suffice it to say, that if we are to be guided by the recorded descriptions of the dissections of joints in which subluxation forwards has been detected, there is not the least similarity between them, in any one respect.

Observations such as these, made in the dissecting-room, are necessarily and unavoidably imperfect. The practical anatomist is seldom able to trace the previous history of the individual on whose body the observations are made, and if, by chance, he can trace it, it is generally but for a brief period, and scarcely ever reaches that at which the lesion occurred. Both individuals from whom the foregoing facts were obtained, were unknown, so that we are left entirely in the dark respecting the causes of the displacement. I cannot, however, refrain from attempting to deduce them from the data afforded by the circumstances with which we are already acquainted. A blow or a fall insufficient to cause complete luxation of the head of the humerus, might still be accompanied with sufficient force to drive it into the abnormal position it was found to occupy in these two cases. I have no doubt that the displacement may be caused by direct injury, but I am also led to believe that it might originate in another manner. There is a trial of strength performed in Scotland, and, I believe, in Scotland only, which those who practise it, designate by the unmeaning phrase of "putting you down." It consists in two individuals seating themselves opposite each other, joining their right hands together in a peculiar manner, closely approximating and fixing their elbows on a table, or any other stationary object, and then attempting to twist each others arms down to the object on which their elbows rest; the individual who can twist outwards his antagonists arm in this amiable manner, into the required position, being declared the victor. Now, I conceive that this trial of strength may induce subluxation of the humerus forwards and inwards. During its performance all the muscles of the arm and shoulder are violently and continuously contracted. If the arm should then be suddenly and violently rotated outwards and extended, we might expect that the muscles so suddenly stretched would suffer considerable injury. I believe that the subscapularis and pectoralis major muscles might be rendered inert by this violent over extension, and that these muscles being inactive and the force being continued, the head of the humerus might be readily displaced. The head of the humerus can certainly be thrown into the abnormal position before described by rotating the arm suddenly outwards after the pectoralis major, and the subscapularis muscles have been detached from their humeral attachments. I have tried the experiment several times in the dissecting-room, and have never failed to displace the head of the humerus from the glenoid cavity, and to twist the greater tuberosity into it, without rupture of the capsular ligament. We have only to presume that this can be done, under certain circumstances, in the living body, and we have all the conditions necessary to induce the deformity, and the changes observed in the articulating surfaces of the shoulder joint. The pectoralis major, and subscapularis being unable to act from over extension, and the

external rotator muscles being shortened to a considerable extent, and having no resistance to overcome, the head of the bone would be retained in the abnormal position into which it had been forced, whilst the flexor and extensor muscles, not having been involved in the injury, and still performing their functions, would cause those movements, by which the thread of the bone would be bound down or absorbed, in consequence of the border of the glenoid cavity, rubbing against the anatomical neck of the humerus which is unprotected by cartilage. The work of destruction once commenced, the muscles, although they might have recovered their tone, would be unable to re-instate the head of the humerus in its proper position. This is merely conjectural on my part, but unless we assume the muscles to be altered in the manner I have indicated, it would be impossible to account for the production of the alterations in the bones. They are observed to be altered in that manner, after the alterations in the bones have occurred; whether they are primarily in that state cannot be ascertained. Eversion of the arm could alone induce such changes, and hence I am led to believe there is some connexion between the very evident eversion of the limb seen in the cases I have detailed, and the violent and forcible twisting outwards of the arm, practised in the trial of strength to which I have referred. Professor Syme, I understand, has found it a prolific source of dislocation of the radius, may we not, therefore, be justified in supposing that the injury is occasionally inflicted on the shoulder instead of the elbow joint, the condition being similar?

Little can be said about the treatment to be adopted by the surgeon, for the restoration of the perfect use of the limb, if he should chance to meet with a case of this subluxation in a living individual. The luxation may be reduced, by lifting the head of the humerus out of its abnormal position, by the aid of a towel, the arm being rotated inwards, and carried across the trunk; and when reduced, might be treated according to the common principles of surgery, although, it is more than probable, that the displacement would remain permanent, in consequence of the changes in the joint, unless it came under the notice of the surgeon at an early period.

Before concluding this imperfect notice, I would remark, that whilst the opinion I have advanced respecting the cause of this subluxation is purely hypothetical, the changes induced by it, and the characters by which it may be recognized, are taken from direct observation made on two well marked cases. My only intention in recording these observations, is to bring under the notice of the surgeon, the existence of, and the character by which he may distinguish this subluxation of the humerus, and under the notice of the surgical pathologist, the occasional existence of lesions in the articulating surfaces of the bones entering into the formation of the shoulder joint, which have been hitherto undescribed.

